THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS

1. A method for enhancing the performance capability of an existing natural draft cooling tower, wherein the cooling tower:

(a) is adapted including by size and cooling capacity in natural draft operation for use as a natural draft cooling tower in electric power generating station application,

(b) includes a structure defining an internal passage of circular cross-section for the upward convectional flow of an air steam therein from air inlet openings at or near a lower part of the structure to an outlet opening at the top of the structure, and

(c) contains heat transfer means in a lower part of said passage for transferring heat from water supplied to said cooling tower to said air,

and wherein said method includes the steps of:

providing within said passage an impeller adapted when rotated at a specified speed about an upright axis of rotation centrally located in said passage in a specified operating condition of said tower to increase the flow rate of air in the passage beyond an overall flow rate obtainable in identical operating conditions by natural draft alone;

providing support means adapted for supporting said impeller within said passage above said heat transfer means; and

providing drive means capable of rotating said impeller at said specified speed.

2. A method according to claim 1 wherein said heat transfer means includes a packing structure having surfaces arranged to be wetted externally by said water so that heat is transferred from said water by evaporation of a proportion of said water into said air.

3. A method according to claim 1 or 2 wherein said impeller when rotating at said specified speed spans substantially the entire diameter of said passage at the height of the periphery of said impeller save for a suitable operating radial clearance between said impeller and an internal surface of said passage.

4. A method according to any one of claims 1 to 3 including the step of securing said support means to at least one of a foundation and a support structure of said packing structure of said cooling tower.

5. A method according to any one of claims 1 to 4 wherein one said impeller only is provided in said passage.

6. A method according to any one of claims 1 to 5 wherein said impeller is supported by said support means at a height in said passage at least approximately corresponding to the minimum cross-sectional area of said passage.

7. A method according to any one of claims 1 to 4 wherein said impeller is supported by said support means at a height in said passage below a height at which said passage is of minimum cross-sectional area.

8. Apparatus for enhancing the performance of a natural draft cooling tower, said apparatus being adapted to use in a cooling tower that:

(a) is adapted including by size and cooling capacity in natural draft operation for use as a natural draft cooling tower in electric power generating station application,

(b) includes a structure defining an internal passage of circular cross-section for the upward convectional flow of an air steam therein from air inlet openings at or near a lower part of the structure to an outlet opening at the top of the structure, and

(c) contains heat transfer means in a lower part of said passage for transferring heat from water supplied to said cooling tower to said air,

and said apparatus including:

an impeller adapted when rotated at a specified speed about an upright axis of rotation centrally located in said passage in a specified operating condition of said tower to increase the flow rate of air in the passage beyond an overall flow rate obtainable in identical operating conditions by natural draft alone;

support means adapted for supporting said impeller within said passage above said heat transfer means, and

drive means capable of rotating said impeller at said specified speed.

9. Apparatus according to claim 8 wherein said impeller when rotating at said specified speed spans substantially the entire diameter of said passage at the height of the periphery of said impeller save for a suitable operating radial clearance between said impeller and an internal surface of said passage.

10. Apparatus according to claim 8 or 9 wherein said support means is secured to at least one of a foundation and a support structure of said heat transfer means of said cooling tower.

11. Apparatus according to claim 10 wherein said heat transfer means includes a packing structure having surfaces arranged to be wetted externally by said water so that heat is transferred from said water by evaporation of a proportion of said water into said air.

12. Apparatus according to any one of claims 8 to 11 having one impeller only.

13. Apparatus according to any one of claims 8 to 12 wherein said support means is adapted to support said impeller at a height in said passage at least approximately corresponding to the minimum cross-sectional area of said passage.

14. Apparatus according to any one of claims 8 to 13 wherein said support means is adapted to support said impeller at a height in said passage below a height at which said passage is of minimum cross-sectional area.

15. Apparatus according to any one of claims 8 to 14 wherein said impeller has a hub and a plurality of blades secured to and in use extending generally radially from said hub.

16. Apparatus according to claim 15 wherein said blades are secured to said hub via pivot means such that each blade is able to be pivoted between an operating position, assumed when said impeller is rotating at said specified speed, and a further position in which an outer end of said blade is lower and radially inward of a position occupied by said outer end when said blade is in said operating position.

17. Apparatus according to claim 16 including means whereby each blade assumes said further position when said impeller is stationary.

18. Apparatus according to any one of claims 15 to 17 further including protection means securable to an internal surface of said passage at a position such that when said impeller is rotating at said specified speed, said protection means is adjacent to the outer end of each said blade and adapted to limit damage to said internal surface due to flinging of moisture from said blades.

19. Apparatus according to any one of claims 15 to 18 wherein each said blade has a formation at a radially outer end of said blade adapted to limit flinging of moisture collected on said blade onto an internal surface of said passage when said impeller is in said operative position.

20. Apparatus according to any one of claims 8 to 19 wherein said drive means includes an electric motor.

21. Apparatus according to claim 20 wherein said electric motor is outside said cooling tower structure and arranged to rotate said impeller via a gear train enclosed in a casing in said cooling tower structure.

22. Apparatus according to claim 20 or 21 wherein said electric motor is operable when required as a generator so that if said impeller is rotated by a natural draft within said cooling tower energy can be extracted from said generator.

23. A cooling tower for cooling a liquid and having a cooling capacity variable by a user, said cooling tower:

(a) being adapted including by size and cooling capacity in natural draft operation for use as a natural draft cooling tower in electric power generating station application,

(b) including a structure defining an internal passage of circular cross-section for the upward convectional flow of an air steam therein from air inlet openings at or near a lower part of the structure to an outlet opening at the top of the structure,

(c) containing heat transfer means in a lower part of said passage for transferring heat from water supplied to said cooling tower to said air, and

(d) including apparatus according to any one of claims 8 to 22 for increasing the cooling capacity of said cooling tower when in operation.

23. A method for enhancing the performance of a power generation plant in which:

steam is passed through a turbine which drives an electric power generator and said steam is condensed in a condenser;

cooling water for said condenser is circulated through said condenser and a natural draft cooling tower;

said method including the steps of:

adding to said cooling tower apparatus for enhancing the performance of said cooling tower, said apparatus being apparatus according to any one of claims 8 to 22; and

operating said apparatus.